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SOME ISSUES IN THE TEACHING OF HANDWRITING. II

FRANK N. FREEMAN
The University of Chicago

III

The previous article closed with a discussion of the application of the general issue between the analytic and the synthetic methods to the relation of form and movement.

A question which is closely related to the one which has just been discussed concerns the advisability of training all of the elements of the writing movement simultaneously, or training first one and then the other. The same answer may probably be given here as in the question of the relation of form and movement. The writing movement is so complex that it is doubtless better (unless indeed we attempt to confine it to one component) to lay emphasis first upon one of the components and then upon the other. The question then remains whether it is better to train first the finger component or the arm component. This question has already been touched upon. It may be added to what has already been said that although the child may use the finger movements predominantly in his early writing at the desk, the arm movements may be advantageously employed in writing at the board or even in writing with wax crayon or pencil upon paper. That is, when the child is using materials which call for large rough movements he may readily employ the arm movements. But when he is attempting to write letters in smaller compass and to produce letters correct in form it is probably well to allow him at first to follow his natural inclination to use the finger movement.

The use of the arm component in conjunction with the finger movements may then be deferred until the child has developed greater motor skill and control.

IV

The third application of the alternative between the analytic and the synthetic methods is found in the development of the letter forms. That is, the procedure may be to begin with words or groups of letters and lead the child to perfect the individual details of form by a subsequent analysis. This procedure has the advantage of eliciting the interest of the child from the beginning, and of training not merely the separate letters, but also at the same time the connections between them. The advantages then of this method are based upon the considerations of interest and economy.

The synthetic method, on the other hand, begins with the individual letters or even the so-called "elements of the letters." The extreme form of this method is now very seldom used, but was quite common two or three decades ago, and we still find traces of it. The extreme synthetic method is fallacious in supposing that the elements into which the letters are analyzed are the psychological elements of the letters. It therefore puts an unnecessary burden upon the mind of the child by calling to his attention these artificial parts of the letters. The letter is a psychological unit and defects in its form may be remedied by calling attention to them without the burden of the procedure of developing a series of elements. The question, then, is concerned with the alternative between the use of letters or of words at the beginning of the writing drill. The use of the letters—that is, the synthetic method—has the advantage of thoroughness in the training of the perception of form. It is a question, however, whether it is necessary to use the one or the other of these two methods exclusively. If words are used as the main basis of writing, then this procedure may be supplemented by the introduction of drill upon the letters whenever this seems to be necessary to remedy defects which may be found, or systematic drill upon the letters may be used to supplement the writing of words.

V

The final question in the teaching of writing to be discussed concerns the best form of movement to be employed. Several different forms of movement are distinguished in ordinary practice. These may be designated as the free-arm movement, the arm movement with rest, the finger movement, and the combined movement. The free-arm movement is made by swinging the arm freely from the shoulder. The arm movement with rest is the same as the free arm movement, except that the forearm rests upon the desk. This is often called the muscular movement, because the arm moves upon the muscle pad in the forearm as a sort of pivot. This term, however, is clearly a misnomer, since all movements are muscular, and the term "arm movememt with rest" is a much better one.

The arm movement and the arm movement with rest are made without the co-operation of the fingers in the formation of the letters. In the finger movement, on the other hand, the fingers form the letters without the co-operation of the movement of the arm. The arm is only used so far as is necessary to carry the hand across the page. In the combined movement the arm carries the hand freely across the page, and co-operates to a certain extent in the individual strokes of the letters, but the fingers produce for the most part the details of the letters.

There is a third movement which is not included in the catalogue given above, but which may co-operate to a considerable extent in carrying the hand from one letter to another, and even in making the longer strokes of the letters. This movement is the rotation about the wrist joint.

The question now is, whether it is better to seek to develop one or the other of the extreme types of movement, or the combined movement. Extreme finger movement may be left out of account, since its disadvantages are manifest. The issue is between the exclusive use of the arm movement and a use of the combined arm, finger, and wrist movement.

The discovery of the advantages of the arm movement by teachers of commercial penmanship has led to its very general

adoption. It is a question, however, whether there are not disadvantages in this type of movement which minimize its advantages when it is used to the exclusion of the finger movement. The extreme emphasis on arm movement may be natural as a reaction against exclusive finger movement, but the whole question may now be thrown open for psychological analysis and for impartial investigation.

The arguments for the arm movement may be reviewed briefly. In the first place, arm movement is held to be superior because it involves so-called fundamental movements in distinction to the finger movements which are described as accessory. The meaning of fundamental and accessory movements in current use is not always clear. Several different meanings may, however, be distinguished. A fundamental movement is sometimes described as one which involves the larger muscles. If this is the basis of the distinction, it is clear that fundamental movements are by no means exclusively characteristic of the earlier period of the child's development, and cannot therefore be held to be more natural because of priority. The infant possesses very early many movements which involve small muscles. Among these are, for example, movements of the eyes, movements used in facial expression, the movements of the lips, tongue, and throat in sucking and swallowing, and the movements of the hand in grasping. These all develop before there is control over the large muscles of the trunk and legs in sitting, standing, or walking.

The second distinction which is sometimes made is that between central and peripheral movements. Central movements are those of the trunk or near the trunk, and peripheral movements those toward the extremity of the limbs. Thus finger movements would be peripheral. It is by no means certain, however, that the child shows a decided preference for central as distinguished from peripheral movements. The grasping reflex often appears during the first few days of life. Movements of the toes and feet are also very common in early infancy, and the abundant movements of the face may be regarded as peripheral in comparison with body movements.

These are the more common interpretations of fundamental and

accessory movement. A third distinction is more important. This distinction relates to the degree to which a movement is developed as an instinct early in the evolution of the race. Thus grasping is a fundamental movement, while writing is an accessory movement. As a consequence of this principle, the more a habit which is to be acquired has in common with instinctive movements, the more easily it may be learned. This distinction, however, does not affect the issue between finger and arm movements since writing by either form of movement is not instructive.

The ease or difficulty with which a new movement is learned, then, is not determined to a great extent by the degree to which it is fundamental or accessory in the above senses of the terms. The conditions which do render a new movement difficult are, in general, the degree of its complexity and the degree of delicacy of adjustment which it demands. A movement which involves the co-ordination of a large number of different elementary movements is very much more difficult to learn than one which involves fewer elementary movements. Again, the movement which must be made within very narrowly defined limits is more difficult than a large coarse movement. From this point of view the arm movement possesses both an advantage and a disadvantage, in comparison with the finger movement. The arm movement clearly is less complex than the combined arm and finger movement, and so far forth is easier. On the other hand, the fingers are capable of a more delicate adjustment than the arm, and in this respect they have the advantage. We must therefore appeal to other considerations in order to arrive at a solution of the question.

Another reason which is offered why the arm movement should be preferred to the finger movement is that it is less fatiguing. There are no tests by which this question has been investigated, but general experience would seem to bear out the contention. It is found, for example, that writer's cramp may be prevented or to a certain extent relieved by an emphasis on the freer arm movements. It should be pointed out, however, that this consideration is not entirely conclusive. The use of the arm movement may render the total movement less fatiguing partly because it renders the writing freer and more open, and partly because it distributes the

work by dividing it between the fingers and the arm. Another reason that this procedure relieves cramping is that the larger muscles are not so easily set in motion by the nervous impulse as the smaller muscles. It is observed, for example, that in some forms of general nervous excitation it is the smaller muscles which are first affected. There seems then to be a tendency to over-emphasize the use of the smaller muscles, and it is therefore worth while to counteract this tendency by consciously emphasizing the use of the larger muscles. The evidence then indicates that the arm movement should be employed, but not necessarily to the exclusion of the finger movements.

A further reason which is advanced for the use of the arm movements is that they are more rapid than the finger movements. The fact which is here appealed to is doubtful. Experiments which have been made to determine the relative speed of movement of different joints of the arm and hand have shown that one can tap with the finger the most rapidly, and with the wrist, elbow, and shoulder successively less rapidly in the order named. The comparison of a rapid succession of up and down strokes made with the finger movement and with the arm movement also shows that the finger movement is slightly more rapid than the arm movement.

The arguments which may be advanced then in favor of the exclusive use of arm movement are not conclusive. They do indicate that the arm movement is a necessary element in the best form of writing movement.

There are further some considerations against the exclusive use of the arm movement. It is a fact which may readily be confirmed by observation that even when the exclusive arm movement is taught in the school, the pupils revert to a combined movement. That is, the teaching is not successful in training the exclusive use of the arm movement. This would seem to indicate on the face of it that it is natural to use the fingers to perform part of the work of writing.

This inference from general practice is confirmed by experiments upon the relative accuracy or delicacy of control of the fingers and of the arm. It has been found that the fingers are capable of a much more exact and delicate adjustment than the arm. It has

also been found that when it is necessary to make a delicate adjustment there is a tendency to emphasize the use of the fingers in contrast to the arm. This would indicate that the fingers are well adapted to perform the parts in the production of the letters which require the more delicate adjustment.

A further general consideration is that the movement of the arm requires the expenditure of much greater energy than the movement of the fingers, on account of the larger mass which must be set in motion. There is consequently more inertia to be overcome when the whole arm is used to make the details of the letters.

It would seem from a psychological analysis of the writing movement, then, that the most favorable type of movement is one which combines the use of the arm, of the wrist, and of the fingers, in such a way that each does the work for which it is best adapted. The arm is clearly adapted to carry the hand along the line. Rotation about the wrist may readily carry the fingers along during the course of the formation of a group of letters or of a word. The fingers may co-operate by producing the details of the letters. In general the best condition for an efficient movement is one in which the various joints are not held in a rigid position, but in which there is such flexibility that there may be smooth and harmonious co-operation between them. The suppression of one component movement on the part of the hand which is naturally flexible requires a condition of continual muscular tension and this interferes with ease and rapidity of the whole movement. The condition which is most favorable, then, to a rapid and easy movement is one of general flexibility and of harmonious co-operation of the different joints.

Such then are some of the issues which confront the teacher of writing, and such are at least some of the psychological principles which must be taken account of in their solution. Whether the solutions are correct or not may be decided by the trial of the alternative methods under standard conditions, and with a measurement of the results obtained by them. The writer would repeat, then, the suggestion made at the beginning of these articles, that these or other questions be submitted to practical tests and to a measurement of the results of these tests so that some definite check may be made upon the theoretical considerations.

REPORT ON THE STUDY OF RETARDATION IN THE SCHOOLS OF INDIANAPOLIS, 1908–1911

GEORGE A. MIRICK
Acting Superintendent of Schools, Indianapolis

In the spring of 1908, as a result of discussions in the meetings of the supervising principals, and of some informal investigations, the superintendent of schools, Dr. C. N. Kendall, arranged that a full report of retarded pupils be made at the time of the term promotions in June. (The school year is divided into two terms, one closing January 31, the other closing June 15.)

In carrying out this arrangement, the following blank was prepared:

INDIANAPOLIS PUBLIC SCHOOLS

REPORT ON PUPILS WHO HAVE BEEN RETARDED IN THEIR PROMOTION

This report is to be made out in duplicate at the close of each term. One copy is to be filed with the principal of the building, the other to be sent to the school office.

This report is for statistical purposes only. All pupils therefore should be included in the reckoning who have been registered during the term, provided they have not left school, moved from the city, or been transferred to another building.

C. N. KENDALL, Sup't of Schools.

Name	Age*	Grade	Years in Indianapolis Public Schools	Terms in Present Grade	Causes of Retardation†						Subjects Failed in†							Remarks
					Ill-health	Idleness	Slowness	Absence	New to City Schools	Mental Defect ‡	Math.	Geog.	History	Oral Reading	Silent Reading	Composition	Spelling	

*A pupil is five years old until he is six, etc.

†Indicate the causes which apply to each case and the subjects failed in with an X in the proper column.

‡No child should be classed as mentally defective who has been able to reach the sixth grade. Below the sixth grade, class those as mentally defective only whom the Director of Physical Training or the Supervising Principal has so classed.

Number of Pupils belonging to Grade .....

School.....

Date.....

Teacher.....

Reports on these blanks have been made by each teacher in the city each half-year since June, 1908.

Reduced to percentages, the retardations may be tabulated as follows: The 1B record is not here included, for reasons explained later. The June, 1909, record has been accidentally destroyed.

TABLE OF RETARDATIONS

FIGURES REPRESENT PERCENTAGES

WHITE SCHOOLS

Grades	June 1908	Jan. 1909	June 1909	Jan. 1910	June 1910	Jan. 1911	June 1911
1B.....	....	...	....	...	...	...	...
1A.....	8.0	5.8	....	5.9	7.0	6.3	4.7
2B.....	9.6	5.1	....	8.3	5.2	6.6	2.8
2A.....	12.0	7.1	....	7.2	6.2	4.9	2.8
3B.....	13.8	8.2	....	9.7	6.8	6.1	4.5
3A.....	14.0	8.3	....	8.3	8.9	7.8	4.7
4B.....	16.7	8.3	....	9.2	8.5	8.0	5.6
4A.....	14.0	8.1	....	7.8	8.8	6.3	4.5
5B.....	14.0	8.6	....	8.1	7.5	5.0	3.8
5A.....	14.5	6.5	....	6.8	6.0	4.8	3.7
6B.....	13.0	6.0	....	7.8	6.2	4.6	3.7
6A.....	13.0	6.2	....	4.9	4.7	5.6	3.1
7B.....	15.0	7.0	....	4.1	3.3	4.0	4.3
7A.....	13.1	5.0	....	4.3	4.1	2.6	4.1
8B.....	10.8	4.6	....	3.0	2.3	1.8	4.7
8A.....	3.0	1.0	....	0.7	0.1	0.4	0.6

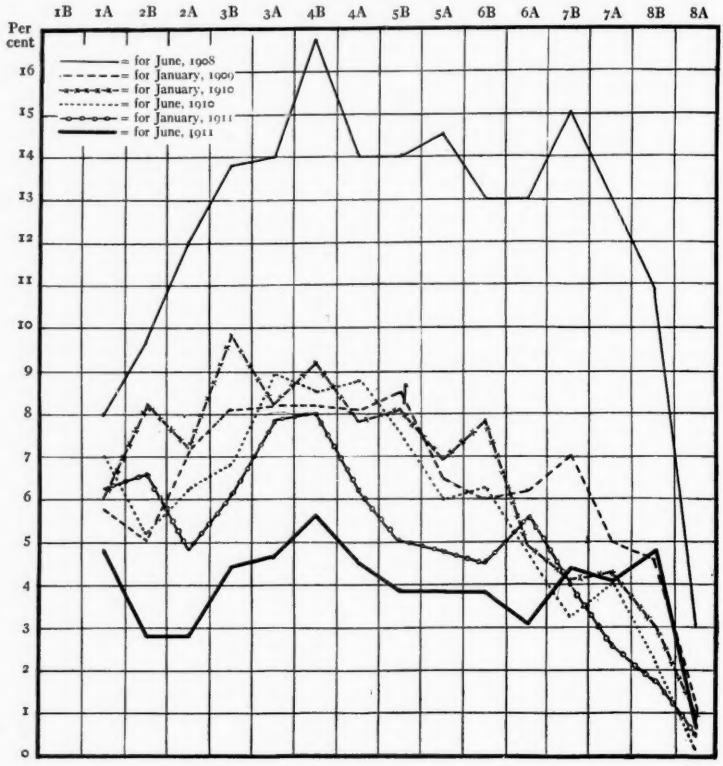
COLORED SCHOOLS

1B.....	....	....	....	...	...	....	....
1A.....	4.6	11.4	....	6.5	6.1	6.5	7.8
2B.....	6.9	7.2	....	7.1	6.1	10.2	10.5
2A.....	8.0	9.0	....	7.9	7.9	4.7	7.6
3B.....	8.7	7.2	....	6.2	3.7	8.4	18.5
3A.....	11.0	9.6	....	6.8	4.2	4.4	9.6
4B.....	9.0	9.6	....	9.9	10.6	6.5	5.6
4A.....	6.9	8.4	....	5.1	0.5	6.3	5.8
5B.....	6.7	7.5	....	8.8	8.7	4.4	10.3
5A.....	7.0	4.8	....	5.6	6.3	3.4	11.1
6B.....	5.4	3.6	....	7.6	4.2	4.4	9.3
6A.....	5.4	2.7	....	4.8	4.2	5.8	9.6
7B.....	4.8	5.1	....	0.8	4.2	5.2	18.0
7A.....	2.0	3.9	....	3.6	4.2	1.5	27.5
8B.....	1.8	3.0	....	2.8	2.1	4.7	27.0
8A.....	0.7	0.0	....	3.4	0.7	2.8	14.7

As the table for white schools includes the records of approximately 24,000 children and that for the colored schools includes

the records of only about 2,500 children, the table for the white schools has been taken for purposes of general study.

TABLE OF RETARDATIONS IN WHITE SCHOOLS GRAPHICALLY REPRESENTED



The reports of the "Retardation" of June, 1908, were tabulated and were studied in the meetings of the supervising principals during the fall term. Some of the facts brought to light were:

1. An excessive retardation was reported in a few schools.

2. The "crests" of retardation were in the 4B and 7B grades.

3. Among the causes of retardation "mental defect" was frequently given, even in the seventh and eighth grades. (The

first blank has no footnote limiting the use of the term "mental defect.")

4. Among the causes of retardation "mathematics" was very prominent, with attention called to "lack of reasoning power."

5. Another prominent cause of retardation was "oral reading."

6. Many cases of retardation were reported of pupils several years over age for their grades, although they were not reported as mentally defective.

The results of this study of the "Retardation Reports" were:

1. An investigation by the supervising principal of these facts and of their causes in each district. (In Indianapolis a supervising principal is assigned to a district varying in size from fifteen to fifty teachers. The supervising principal is responsible for efficiency of instruction and grading of pupils in the district.)

2. A recognition of the fact that supervising principals and teachers were not thinking alike on the matter of the promotion of doubtful children.

3. A confirmation of the suspicion that the real mentally defective child was a factor in general retardation.

4. The opening of two additional schools for mentally defective children and the fixing of a standard for judging of such children. One school for mentally defective pupils had been started before 1908. The next blank contained the footnote regarding this class of children.

5. The placing of "special teachers" in buildings where the need was greatest, to study and help retarded pupils. There are now eight such teachers in the city. A careful record is kept of the work of each teacher, and it appears from these records, made by the supervising principals, that each teacher helps from fifty to seventy-five children to make their promotion each term.

6. That two studies stood out prominently as stumbling blocks: mathematics and oral reading. In mathematics much of the "explanation" or "reasoning" work required proved to be poorly graded and too elaborate.

7. Evidence was seen that in determining promotions too much emphasis was placed on memory proficiency, especially in the upper grades, and too little credit was given to the child's

mental ability, general interests, bodily conditions, and possible improvement during vacation.

8. The discovery that a particularly high standard was held in mind at certain grades because of the assumed special difficulties or hazards to be met in the next grade. This was conspicuously true in grades 4B and 7B.

In general, there was evident on the part of all in charge of the children an attitude toward accepted standards of judgment and toward habitual practices by which they were restudied and the course of study was somewhat modified.

It became evident early in this investigation into retardation that the first grade was a problem by itself. In Indianapolis the first-grade pupils enter in largest numbers in September and April. If they are six years of age they may enter at other times, and somewhat large additions are registered at the beginning of the winter term, February 1. The first-grade pupils go to school one session only—one group of forty-five in the morning and another group of thirty in the afternoon. The first-grade teacher therefore has under her instruction about seventy-five pupils. Many of these pupils are so irregular in attendance that this first term is of little tangible value. The first-grade teachers have found it difficult to classify these pupils for statistical purposes. The reports were so various that they gave little reliable information. In June a report was made on the following blank:

INDIANAPOLIS PUBLIC SCHOOLS

REPORT ON PROMOTIONS AND RETARDATIONS

GRADES 1B AND 1A

NOTE.—Teachers are asked to report all 1B and 1A pupils on this blank. The individual report of retarded pupils need not be made out for these grades.

NOTE.—Please make these reports in duplicate—one copy to be given to supervising principal and one to be sent to school office with blank entitled Report of Retarded Pupils.

1B GRADE

	Less than 2 Mo.	2–3 Mo.	3–4 Mo.	4–5 Mo.	5–6 Mo.	6–7 Mo.	7–8 Mo.	8–9 Mo.	More than 9 Mo.
Total number present*.....									
Number not advanced to 1A grade.....									

1A GRADE

Total number present.....									
Number not advanced to 2B grade.....									

* Children are here scheduled by their *attendance*, not by their membership. A full and accurate account of all first-grade pupils is desired. This report should therefore include all the *different* 1B and 1A pupils who have been enrolled during the current term, except those transferred to other schools. Those who are not members when this report is made out, but who will return, should be included.

DATE..... SCHOOL NO.....

SUPERVISING PRINCIPAL..... TEACHER.....

The increased interest in the retarded child resulted in some very interesting experiments and related investigations by several supervising principals and teachers. There was a clear and uniform suggestion lurking in all these experiments and inquiries—namely, that our promotions were based too largely on a small number of the factors involved in the problem of the child's fitness to go on; too exclusive attention seemed to have been given to the factors enumerated below in column "A," while the factors enumerated in column "B" had not been given due consideration.

A

1. In how many of the required subjects of study has the pupil *failed?* Daily marks. Tests.
2. How much has been the absence?
3. What have been the delinquencies of conduct?

B

1. In which of the required subjects of study has the pupil *succeeded?*
2. In those subjects in which a pupil failed, was the failure total or partial?
3. If the failure was either total or partial could it be made good in next grade provided pupil worked?
4. Provided the failure was complete in one subject, as in mathematics, does the failure appear to be due to inability to comprehend or to slow maturing? If the latter, may this failure be made good at time of review in later grades?
5. If failure is due to omission of some parts of curriculum, as in geography, may omissions be made good in later grades?
6. Has the pupil "gotten on" with the present teacher? How much of the failure is due to unadaptability to teachers

or to accidental environment in the schoolroom?

7. What is the general intelligence of the child?

8. Is the child a "static" or a "developing" individual? May the possibilities of change of environment and teachers, a summer's vacation, or the stimulus of "trial" be legitimately given large consideration in determining promotion?

The first column contains the tangible, measurable, markable factors in the problem. They are also largely negative in character—an inventory of failures rather than of successes.

The second column contains the factors which are more vital, but less visible. It seemed to be true that we were judging that a child could not succeed in the grade beyond, provided he had failed in two or more of the fundamental studies of the school curriculum—this failure established in case of doubt by written or oral tests. The question persistently formulated itself, "Are we judging right?"

Light had been thrown on this question by a rough study which was made by one of the supervising principals. He wished to find out the effect of retardation on pupils of fourteen years of age and over. He found that in a relatively large number of instances these children had not returned to school. Those who had returned seemed indifferent. After a private talk with groups of those who were yet in school he advanced them arbitrari y on trial. The teachers understood and were sympathetic. The largest part of those then advanced did as well as they had previously done. A few took a higher standing in school than they had before taken. Some failed.

Thus it appeared to be true that where it was judged the child could not succeed by promotion and on trial he *did* succeed, in every such case, we had judged wrong. To bring this phase of the retardation problem strikingly to the attention of all and to enlarge the study of it the following blank was sent to each teacher:

INDIANAPOLIS PUBLIC SCHOOLS

REPORT ON PUPILS PROMOTED OUT OF THE REGULAR ORDER AND ON TRIAL

DURING TERM FEBRUARY 1 TO JUNE 16, 1911

IRREGULAR PROMOTIONS

NOTE.—By Irregular Promotions is meant promotions made after the term has opened. These may have been on trial, but if made after the term has opened, they should be recorded in this schedule.

NOTE.—Please make out in duplicate—one copy to be given to supervising principal, the other copy to be sent to the school office with the blank on Report of Retarded Pupils.

Grades	1B	1A	2B	2A	3B	3A	4B	4A	5B	5A	6B	6A	7B	7A	8B	8A
Total																
Failures																

PROMOTIONS ON TRIAL

NOTE.—By Promotions on Trial is meant promotions made with trial conditions in January at time regular promotions were made.

Grades	1B	1A	2B	2A	3B	3A	4B	4A	5B	5A	6B	6A	7B	7A	8B	8A
Total																
Failures																

DATE..... SCHOOL NO.....

SUPERVISING PRINCIPAL..... TEACHER.....

It was inevitable that the entire problem of grading should be drawn into discussion as a result of this study of retardation. Supervising principals and teachers began to compare the relative ability of the pupils and to test whether or not each was working at his educative best.

Several deductions of importance were drawn from this discussion:

1. The course of study should be thought of as a means by which the development of a growing child may be helped, not as an end at which the child stops or a standard by which this development is to be exclusively measured. It is not a ladder by which a human mind is to climb, but a dietary by which it is to be nourished. Inasmuch as the course of study is in process of constant change it should not be taken too seriously.

2. The teacher who has had the child for an entire term is not the best final judge of the question of the promotion of a "doubtful" pupil. The "personal equation," the fear of the criticism of the next teacher, the schoolroom standards, influence too often when the matter is left entirely to the teacher.

There seemed to be only one way of determining with certainty whether or not a pupil should be promoted. That way was to "put it up to him," to let him try.

Seven schools were chosen in different parts of the city in which, in June of this year, every child was promoted. Those who would not have been promoted or who would have been promoted on trial if the customary plan had been followed were tabulated, so that they could be identified the following term.

The plan involves a six weeks' period of trial. The teachers are asked not to force these children to unusual efforts during the trial period. At the end of six weeks those whom the teachers feel would be benefited by repeating the previous grade work will be put back.

The results of this experiment will not be known until about November 1.

An analysis was made of the reports on retardation for the term closing January, 1911, to find out what effect large numbers in a room had on retardation.

A single table is given in full showing the facts for 42 fourth grades throughout the city. This detailed table is followed by a general table summarizing the results for all other grades. The letters A and B designate respectively schools made up of 35 to 40 pupils (A) and schools made up of from 44 to 51 pupils (B).

GRADE IV

School Membership		Total Retarded		School Membership		Total Retarded	
A	*B*	*A*	*B*	*A*	*B*	*A*	*B*
..	46	..	8	37	..	7	..
..	45	..	3	37	..	3	..
39	..	3	..	38	..	8	..
..	45	..	12	38	..	3	..
..	46	..	13	35	..	2	..
..	44	..	5	37	..	1	..
35	..	2	..	39	..	6	..
..	46	..	8	39	..	2	..
36	..	1	7	40	..	4	..
..	45	..	..	..	46	..	8
38	..	8	..	40	..	6	..
..	45	..	7	36	..	3	..
..	51	..	9	..	47	..	6
..	46	..	6	..	46	..	4
..	47	..	7	37	..	2	..
..	45	..	6	36	..	2	..
38	..	5	..	..	46	..	5
..	45	..	3	..	45	..	1
40	..	5	..	..	47	..	2
38	..	4	..				
40	..	2	..	Pupils...868	873	86	120
40	..	3	..	Schools.. 23	19	..	...
39	..	4	..				

Average retardation in 23 schools, 35–40 pupils.....3.8 pupils
Average retardation in 19 schools, 44–51 pupils.....6.3 pupils
Per cent of retardation in 23 schools, 35–40 pupils..... .09$\frac{8}{10}$ pupil
Per cent of retardation in 19 schools, 44–51 pupils..... .13$\frac{7}{10}$ pupil

Grade	Total Number of Schools Considered	A	B	Total Pupils in A	Total Pupils in B	Retarded in A	Retarded in B	Percentage in A	Percentage in B	Average in A	Average in B
II.....	34	16	18	615	836	56	119	9.1	14.2	3.5	6.6
III.....	56	26	30	996	1397	73	133	7.3	9.5	2.8	4.4
IV.....	42	23	19	868	873	86	120	9.8	13.7	3.8	6.3
V.....	38	25	13	955	608	72	56	7.6	9.2	2.9	4.3
VI.....	31	20	11	765	509	75	40	9.8	8.0	3.7	3.6
VII.....	28	18	10	682	470	60	47	8.8	10.0	3.3	4.7
VIII.....	23	15	8	557	383	32	20	5.7	5.2	2.1	2.5

SUMMARY

SCHOOLS, GRADES II–VI

110 schools with membership 35–40
91 schools with membership 44–51

Number of schools in which not more than 3 pupils were retarded	
Membership 35–40	74
Membership 44–51	35
Number of schools retarding 4, 5, or 6 pupils	
Membership 35–40	25
Membership 44–51	30
Number of schools retarding 7 or 8 pupils	
Membership 35–40	8
Membership 44–51	15
Number of schools retarding more than 8 pupils	
Membership 35–40	3
Membership 44–51	11

NOTE.—Attention is called to the fact that the June retardation line on the graphic representation is possibly affected by the experiment referred to in the report—of promoting all the children "on trial" in eight buildings. The retardation of this term may be increased by later demotions due to the failure of some of these children to keep their places.

It should be understood that this article is of the nature of a report simply; that the statistics are considered as suggestive only; that in no sense are conclusions final; that these figures are not the statistics of the most important factors, but only of partial results, which we consider valuable merely as a basis for further discussion and investigation.

SOME FACTORS THAT DETERMINE THE HABITS OF STUDY OF GRADE PUPILS

WILLIAM CLAUDE REAVIS
Oakland City, Indiana

Investigations by Dr. Earhart[1] of Columbia University have shown that a very large per cent of the pupils of our public schools do not study properly or profitably, and that as a result much energy is dissipated and a great deal of waste in time and effort is incurred. The cause is not to be found in the motives and purposes of the pupils, but in their ignorance of correct habits and methods of study. The term study is an enigma to many children, and when told to study a lesson they generally do everything but the right thing. I have frequently heard pupils respond, when asked if they had studied their lesson, that they had read it over a certain number of times. The recitation showed distinctly that their preparation had been entirely wanting in the zeal, thoroughness, and definite motivation essential to the mastery of an assignment. They had no doubt wasted more energy in aimless efforts than would have been required to master two or three similar lessons, if judicious habits of study had been made use of.

Of course, this will mean new and increased responsibilities for the teachers. It will require on their part a more accurate knowledge of home environments, a greater familiarity with schoolroom hygiene, and a more intimate knowledge of the mental traits and characteristics of the pupils as individuals. "However, if as the result of this endeavor we teach the child how to study effectively, we do the most useful thing that could be done to help him to adjust himself to any environment of modern civilized life into which he may be thrown."

[1] *Teaching Children to Study.*

The following study is an attempt to find out some of the factors both in and out of school that may influence and perhaps determine the habits of study of grade pupils, and to suggest ways by which these influences may be modified and even controlled by the class teacher. The material upon which the discussions are based is the result of a year's observations and carefully kept records in a typical town school system of five hundred pupils. The teachers who took the records were well qualified on the grounds of scholarship, successful experience in the school system, knowledge of the individuality of the pupils, and familiarity with home conditions. Furthermore, the opinion of the individual teacher is corroborated in almost every case by the opinion of at least one other teacher.

In the first place, each teacher was asked to make a very careful study of the methods and habits of study of the pupils in her grade, taking into consideration their habits of application, perseverance, and thoroughness in mastering assignments and their ability to select, organize, and retain. Considerable time was given to the grading of the pupils according to the above points, and in cases in which there was some doubt, judgment was not passed without consultation with other teachers who knew the individuality of the particular pupil under consideration, equally well. When the grading was completed, each grade was divided into three equal tertiles, designated as Class I, Class II, and Class III. By this method of classification, the variation of standards of judgment among the different teachers was reduced to a minimum, so far as the results as a whole were concerned, because each teacher's Class I was grouped with the same class of the other teacher's, and similarly, all pupils of Class II were grouped together, and likewise Class III.

HOME ENVIRONMENT

In the next place, an effort was made to get the exact status of the home environment of each pupil, in order to ascertain, if possible, what relations obtained between the habits of study of the pupil and the rank of his home surroundings. Data concerning the homes of 393 children were gathered and graded according to the following points: educational interest on the part of parents,

means to provide adequate food, clothing, medical attention, books, papers, magazines, and entertainment, and moral atmosphere that would encourage honesty, earnest effort, regard for the rights of others, and a due measure of self-respect. The homes were then divided into three equal tertiles and designated as Rank I, Rank II, Rank III.

TABLE I

Habits of Study	Class I	Class II	Class III
	Per cent	Per cent	Per cent
Environment Rank I	75	19.7	5.3
Environment Rank II	32.4	48.2	19.4
Environment Rank III	15.3	40.7	44

In the above table, it is observed that 75 per cent of the pupils of environments of the first rank, 32.4 per cent of the second rank, and 15.3 per cent of the third rank have habits of study of the first class. The large percentage of first-class students in the environments of the second and third rank is due to two things: first, the home conditions of the town are extraordinarily good, and secondly, by grouping in tertiles the character of the homes of the third rank are much better than if grouped according to some fixed standard of grading, because the number of poor homes being relatively few, the third rank includes many homes that would be ranked higher under the other system of classification. In this particular school the pupils coming from an environment of the first rank have two and three tenths the chances of having first-class habits of study that a pupil has coming from an environment of the second rank. A further examination of the percentages shows that there is a marked correlation between the rank of the home environment and the habits of study of the pupil.

If these results stand for anything, they indicate that home environment is a potent factor in fastening upon the child habits of behavior that are utilized in other kinds of activity. Certain parents said to the teachers when spoken to concerning the habits of work of their children, "That is just the way they do everything at home." One good mother in conversation with the teacher of her son remarked, when told that her son was very care-

less about his habits of study, "That is a family failing, he takes it after his father."

It may be true that an element of heredity enters into the problem, but for the purposes of this study, it will be passed by with the explanation that the pupil may adopt many of his habits of behavior through imitating activities seen in the home, or that he unconsciously takes up bad habits and the home unwittingly permits them to become established in his conduct. At least, the study points out the fact that the possible origin of many of the habits and attitudes of school children is in the home.

TABLE II

HOME STUDY

Environment	Rank I	Rank II	Rank III
	Per cent	Per cent	Per cent
Home study	35.5	54.2	7.3
No home study	4.1	43.8	42.1

In Table II, we see 179 pupils who did home study and 207 who did no home study, distributed according to their home environment. It is interesting to see that the large percentage of pupils doing home study come from environments of the first and second rank, and that the large percentage doing no home study come from environments of the second and third rank. The percentages indicate that the large number of pupils coming from homes of the first rank do home study, while the large majority of those coming from homes of the third rank do no home study. The pupils who come from homes of the second class are very evenly divided. From an analysis of the above table, it is easy to see what class of pupils is kept under parental discipline, and what class is permitted to loaf on the streets during their out-of-school hours. For some time I have recorded my observations of the pupils who seem to spend the greater part of their time on the streets, when out of school, and I find that the great majority come from homes of the third rank. Is it any wonder, then, that more than 50 per cent of the pupils doing no home study belong to homes of the lowest rank?

In a previous study,[1] I have shown that high-school pupils who do regular home study take higher standing in school than those who do no home study. I take the same position with reference to grade pupils. While I know that there are conditions under which home study is not advisable, yet in the large majority of cases it is advisable, as is shown by Table III.

TABLE III

Habits of Study	Class I	Class II	Class III
	Per cent	Per cent	Per cent
Home study	57.7	36.5	6.5
No home study	17.3	45.5	37.2

Table III shows the pupils of Table II distributed according to their habits of study. The large percentage of pupils doing home study have habits of study of the first and second class, and the large percentage who do no home study have habits of the second and third class. The small percentage of home-study pupils having habits of study of the third class and the small number of pupils who do no home study, having habits of study of the first class, convinces me that so far as this particular school is concerned home study is of great value.

The objection is sometimes made that it is not within the power of the teacher to control the home study of the pupils, and therefore, it is better to have them do none. Under the old method of schoolroom procedure, there may have been some validity to this objection, but under the changing methods, I am led to believe that a great deal of home study can be very satisfactorily done. Formerly the chief work of the teacher was to test by means of recitations the character of the pupils' study, and little attention was given to the direction and supervision of study. Now, the work of the class hour is often given up to study recitations, and to teaching the pupils how to study particular lessons or, in a word, to teaching them how to think. Consequently, the pupil may now engage in home study with some degree of efficiency, and if par-

[1] *School Review*, XIX, 395.

ticipated in by the parent, the work may take the form of a recitation rather than teaching.

The problems of school and home study may be rendered more effective by finding out home conditions and securing the intelligent co-operation of the parents through home visitation by the teachers. It is one of the best means of gaining the confidence of parents, for, when they find that the teacher is more than a salaried official, as a rule the majority are both ready and anxious to co-operate in any way the teacher may suggest. Thus, through a mutual understanding between parents and teacher, the work of the pupil in school may be greatly improved.

TRAITS TO BE CULTIVATED

An analysis of the study process will reveal nine mental traits that should be thoroughly understood and made to function as habits in the mental work of a student. The interpretation of these traits are as follows:

1. Speed—the rate of accomplishment.
2. Neatness—orderly arrangement of all written material.
3. Accuracy—reliability of results.
4. Initiative—power to originate, opposite of imitative.
5. Self-reliance—self-confidence, as opposed to self-depreciation and subservience to teacher, books, and classmates.
6. Perseverance—continuity of attention and effort.
7. Ability to organize—power to arrange things according to some definite sequence or order.
8. Ability to select—i.e., to arrange or pick out facts according to their relative value, or with reference to some given theme.
9. Ability to retain—power of making associations.

In order that it might be ascertained whether or not there was a relation between these characteristics and the pupils' school work, the teachers above the fourth grade were asked to study each pupil carefully and grade him according to the nine traits, using the following scale:

I. When the trait was decidedly pronounced.

II. When the trait was noticeable, yet not distinctly marked.

III. When the trait was very weak.

This task was faithfully performed. Although it was done in a quantitative rather than a qualitative way, I attach much value to the judgments. As a matter of fact, the teacher's judgment of the intelligence of elementary-school children is more reliable than any qualitative standards yet devised have been able to give. This has been clearly demonstrated by David Heron of the Galton Laboratory of Eugenics. While the personal equation of the teacher enters into the judgments, still they probably furnish the most reliable data that could be obtained.

The tables and the discussions that follow will show the possibility of modifying or changing the habits of the pupils that are factors in the process of study, and will open up a field of new work for the teachers who have made no effort to direct and control the study of their pupils.

Table IV shows the correlation of the pupils' habits of speed, neatness, and accuracy, and the distribution of the grades in arithmetic according to the correlation involved. The habits were grouped in threes, because of the facility gained in tabulating the results, and because of the possibility of discovering the relative value of the various habits. Arithmetic was selected for the reason that there were more pupils ranking low and high in that subject than in any other, consequently, the correlation obtained between the marks in arithmetic and the habits of study would be more significant than if the pupils' grades had been relatively uniform in character.

In correlating the three habits, it was found that there were twenty-seven different combinations. Of these there were three perfect correlations in which each of the three habits had equal development, six in which the relation between neatness and accuracy was uniform with speed as a recessive character, six in which the relation between speed and accuracy harmonized and neatness was the varying factor, six in which the relation between speed and neatness obtained and accuracy passed into recession, and six in which each of the three habits were different in character of development.

From this grouping, I was able to find the combination of habits that gave the best results, and thus was able to study the

pre-eminence or the recessive character of the different habits as they appeared in the results of the marks in arithmetic, which were obtained through the teacher's judgment of the pupil's worth in that subject, after a consideration of the daily class record and the written work. The results, therefore, ought to be reliable, and should throw some light on the question under discussion.

TABLE IV

Speed Neatness Accuracy	No. of Pupils in		
	Rank I	Rank II	Rank III
AAA	15	4	1
BBB	8	19	4
CCC	0	4	11
bAA	19	4	1
cAA	1	2	0
aBB	1	4	2
cBB	2	5	7
aCC	0	0	0
bCC	0	1	4
AAb	2	4	1
AAc	0	0	1
BBa	2	4	1
BBc	0	0	11
CCa	0	0	0
CCb	3	2	1
AbA	2	4	1
AcA	0	0	1
BaB	7	5	3
BcB	1	5	2
CaC	0	0	0
CbC	0	2	7
ABC	0	0	3
ACB	0	0	0
BAC	0	3	4
BCA	0	1	0
CAB	0	4	0
CBA	1	0	0

Note.—In the above table, the recessive trait is written in small letters, the correlating traits in capitals, and the combinations in which the correlation is perfect or in which the three traits differ i written in capitals.

By bringing certain habits to the foreground, either individually or in correlation with another, and by reducing, similarly, the other habit or habits to the background, we are able to see in

Table IV that the best combination of habits for arithmetic are first-class habits of accuracy, first-class habits of neatness, and second-class habits of speed. This conclusion may seem somewhat absurd, because the above combination is placed ahead of the group of three first-class habits between which the correlation is perfect; but after a careful consideration and an analysis of individual cases, it is easy to verify. When speed is too highly developed in elementary pupils, it often defeats its own end by interfering with the pupil's accuracy and neatness. Thus, by over-development, it becomes negative in character with reference to the other habits.

The table also shows that habits of neatness are a very close second in importance to the habits of accuracy. This is not at all strange, when we take into consideration that in doing work neatly, the pupil must necessarily be more attentive to processes and results. Hence, habits of neatness are very intimately associated with habits of accuracy in efficient work; and by cultivating the one, improvement is likely to be gained in the other.

By following Table IV through carefully, a teacher can easily locate a pupil with reference to his habits of study, and may be able to meet in an efficient way the individual need. To illustrate, a pupil may be exceedingly rapid in his habits of work and as a result fall low in his marks, because of inaccuracies and slovenly work. The teacher should hold the speed in check to a certain extent, and insist upon neat workmanship and reliable results, instead of indulging the habits of speed and permitting the pupil to pay the penalty in classmarks. Such a scheme, although possessing some limitations, is a step toward the control and direction of the pupils' methods and habits of study, and will no doubt bring beneficial results, if consistently followed by the class teacher.

Similar tables were prepared to show the significance of (*a*) initiative, self-reliance, and perseverance; and (*b*) of habits of organization, selection, and retention.

The results of the comparison (*a*) show that perseverance is slightly more important than self-reliance, and that self-reliance is a shade more important than initiative. However, the table

shows that after the group containing the three first-class habits, the combination of first-class habits of initiative, second-class habits of self-reliance, and first-class habits of perseverance probably make the best group.

To anyone who has studied carefully the mental traits of children, it is evident that the above triad of habits is a character-making group. The pupil who possesses any one of them in a marked degree is fortunate, for with any one as a basis the other two may be developed. In school work, then, the three should receive practically equal attention from the teacher, for the pupil who fails to develop strength along some one of these lines, at least, loses a very valuable asset for later life.

The charge has often been made against much of our teaching —and with some justice—that in the school the pupils are entertained rather than exercised, that they are guests of the school rather than hosts, and that they are taught imitativeness and dependence rather than initiative, self-reliance, and perseverance. I have no doubt that these conditions, when they do exist, are due primarily to neglect on the part of the parents and teachers to cultivate and encourage self-activity in the pupils. Self-activity and a feeling of responsibility are the foundation of initiative, self-reliance, and perseverance, and unless these traits receive some direction and gratuitous exercise or, in a word, made to function as habits, they are likely to become dwarfed or abnormally developed.

The two groups of habits discussed in connection with Table IV and in the last few paragraphs are general in character, and although of great value in study, they are equally valuable in any field of human activity. But the habits considered in the final subdivision (*b*) are more specialized in character, and their chief value is to be found in mental activity. Measured according to the traditional purpose and aim of education, this group of habits is *THE* group that ought to be most thoroughly understood and most carefully directed by the teacher, for the success of the pupil in mastering book material will depend very largely upon his ability to select, organize, and retain.

The investigation showed that the factor of greatest importance

is retentiveness. The other two are very similar in value, although the power to organize seems to be slightly more important than the ability to select. This should not appear strange, for the power of establishing and mastering associations carries with it more or less of the ability to organize, while selection is more of an analytical process. An extended discussion of these habits would involve a consideration of apperception, a topic with which every reader should be somewhat familiar. Suffice it to say that by directing and supervising the study of the pupils, as a part of school work, the teacher can give attention to the development of these special habits in special subjects, so that they may be carried over to a certain extent into any mental work that the pupil may have to do.

CONCLUSIONS

In concluding this study I am thoroughly conscious of the limited character of the investigations I have made. Some of the points I hope to work out more fully at some future time. However, I do think that the data warrant several conclusions that should enable the teacher to supervise more effectively the habits of study of the pupils, during a period nascent to habit formation.

1. Home environment is a factor in the formation of study habits. Its influence may be either for good or for bad. It is possible for the teacher to exert some modifying influence over environmental conditions.

2. Home study is desirable, because it acts as a check on the formation of habits out of school, that would be negative in their influence on habits in school. Furthermore, the pupils who do home study are as a rule stronger students than those who do none.

3. By analyzing the habits of study of a pupil, his weakness may be discovered and active and conscious steps may be taken to form, strengthen, or inhibit certain habits that may need attention. This work is entirely within the province of teaching and should receive as careful attention as the teaching of the formal subjects.

STUDIES OF EDUCATIONAL PRINCIPLES

CHARLES H. JUDD
The University of Chicago

II. THE CONCRETE IN EDUCATION

For something over a generation, there has been a very definite reaction in our educational system against the abstractions which had grown up during the earlier period when education was primarily literary in its character. The charge is often made today that the older school which dealt chiefly with writing and reading gave children no sensory experiences, and no concrete material which they could carry in mind while they were learning the words in books, and while they were learning the elaborate forms of expression which were sometimes demanded of them in their reading lessons. The reaction against literary education has, in some cases, been so extreme as to suggest that reading and writing can be very largely left to take care of themselves; that the main business of the school consists in giving children new ideas about the material and social worlds. It is asserted that this larger information will stimulate a sufficient desire for reading, and will, at the same time, give the material knowledge for the interpretation of everything that is found in the books.

Certain changes in the methods of teaching reading have tended to encourage this reaction toward concrete experiences. Thus, we no longer give instruction in the alphabet as the first step in teaching reading because the letters of the alphabet are in no wise connected with the children's experiences of things and with their experiences of spoken words. We begin rather by giving the word-wholes which are directly related to objects and to the spoken words which children know. The word-whole thus has a concrete meaning attached to it from the very first, and the process of analysis into the separate letters is allowed to come at a later stage. This method of teaching reading emphasizes the value of the concrete.

Various types of concrete material have been welcomed into the course of study. In the first place, nature material has been regarded as entirely suitable for even the earliest grades. Children should have their attention turned to plants and animals because these are the most useful and attractive objects in the world, and observation of them fills the mind with material for later intelligent interpretation of the world.

Concrete material of the social type has also been suggested, and children have been encouraged to note the details of the manufacturing processes in which the community is engaged. Pupils have been encouraged to go to the markets where they can see the different products of the factories, and can become acquainted with importations from other parts of the country.

Further than this, children have been encouraged to see the importance of all kinds of constructive work. Here they are in contact with reality in a very direct fashion. When they take materials into their hands, and mold these into useful articles, they get a type of experience which is often described as very much more important than that which can be derived from descriptive accounts given in books.

Even the more abstract subjects which it is regarded as necessary to take up in the school have been given as concrete a character as possible. Thus, we find the books on algebra, and especially the books on arithmetic, filled with all sorts of examples about objects which are thought to be present in the child's experience, and doubtless have appeared before his eyes or have come into his hands. These objects are to be thought of as adjusted and readjusted in greater or less quantities, and the abstractness of mathematics is supposed to be corrected and the difficulty reduced because the child's interest is retained by reference to his ordinary experience.

Devotion to concrete experience is so typical of the educational thought of our day that it may seem bold to suggest any criticism of the interpretation which has been put upon the term "concrete" in our ordinary educational thinking. Furthermore, when one begins to call the concrete in question, he runs some risk of being regarded as opposed to all use of the concrete. It may be well to state, therefore, at the very beginning of this paper, that the present

writer wishes to be distinctly understood as advocating the proper use of all the concrete material that can be employed in the early and in the later stages of education. No return is advocated to the earlier type of formalism against which our present educational tendencies are a protest. This paper, however, aims to draw attention to the fact that the mere presentation of an object to the senses is in no wise a complete educational process; and the eliminating of language, or even its relegation to a place of secondary importance, is not justified by any careful analysis of the child's consciousness or by the demands for complete experience in any proper interpretation of that term.

Let us analyze a simple case which illustrates all of the advantages of concrete experience. The child is brought into contact with some external object, such, for example, as a piece of furniture. This piece of furniture may be forced upon his attentive recognition in a variety of ways. It will be very completely understood if he tries to go through the process of constructing the furniture. He will then become aware of the fact that the different parts of the chair are joined together, and that the joints each represent certain difficult problems in uniting the material which is employed in the construction of the chair. He will also realize that each line of the chair is the result of some careful constructive thought. He will see that the combination of materials is significant; that the different materials employed in different parts of the chair all have special justification. When the chair has been completed, he will have a large amount of direct personal experience which will attach itself to any image of a chair that now comes to his eyes. This fuller experience of chairs will be in part of the sensory type, but it will be in very large measure of the memory type; that is, all later chairs will be more fully recognized because of the one which he made. Furthermore, a very large part of this memory experience will be motor in its character; that is, it will consist of memories of certain types of behavior through which he has passed. The more completely these various types of personal behavior are aroused in his contact with things, the more completely will objects have concrete and vivid meaning to him.

This illustration makes it clear that the meaning of the term

"concrete" is not confined at all to that which appears before the senses at any given moment, nor is it confined entirely to visual or tactual experience. The weaving together of a large number of sensory experiences in some definite relation to personal memories is what is meant by concrete in such a case as this.

Let us turn from this illustration to the wholly different experience which is presented when objects are discussed in arithmetic as a means of giving concrete character to number problems. The child is asked to represent to himself three men working on a certain piece of work which requires their combined effort for two days and a half; the problem being to discover how many men will be necessary to complete the work in half the time if all worked at the same rate as the three who were originally given in the problem. If the child is able to deal with such situations at all he will instantly turn each of these statements into symbols which convert the situation into an arithmetical situation rather than into a situation to be worked out in any concrete, personal way. Indeed, it is the intention of the arithmetic lesson to show him a method of treating this problem of work which is wholly at variance with the method that he would employ if he came into contact with it through his own personal efforts. It is not that he is to dig the ditch, nor to go and see men dig the ditch. He is not to sympathize with their efforts. He is shown through his study of arithmetic a short cut which has been devised at great intellectual expense by the race for the purpose of making it unnecessaay for him or any of his friends to go through the concrete experience of working out the ditch in the two ways contrasted in the problem. He can work out the readjustment of the men and work, as Professor Stout puts it—"in his head." Arithmetic is a short abstract method of working out a problem which it would be quite impossible to work out with anything like the same rapidity "in the concrete."

One sees from such examples that just in so far as a child is trained in the methods of dealing with objects through arithmetical rules, he is taken away from the concrete manipulation of objects.

Another very good illustration of similar type is to be found in our ordinary experience with spatial dimensions. If one wishes

to find out how much paper he needs to cover a certain wall, he does not take the rolls of paper in his hand, and by long and laborious experiments, find out how much of that paper will be needed to cover the wall. He would indeed derive many very concrete experiences in an effort to cover the wall with the paper. He would learn some of the difficulties of handling and manipulating the paper. He would become acquainted with the different devices for making the paper stick to the wall, and would see the difficulty of keeping it smooth, etc. He might have the concrete experience of the paper-hanger, but the ordinary individual needs such experience, if at all, only as an introduction to another and more abstract form of knowledge. He usually wishes to know how far he, as the purchaser of paper, must go in preparing for the fuller concrete experience of someone else who will do the hanging of the paper on the wall. Fortunately he finds himself supplied through racial experience with the very convenient device of measurement. He measures one roll of paper, he measures the wall, and he finds without any actual handling of the paper, or further consideration of it in detail, that he is able through arithmetical devices to work out the amount of paper that he must purchase.

Arithmetic is thus a substitute for concrete experience and a very convenient substitute. When we are trying to cultivate the methods of arithmetical reasoning, we find ourselves continually drifting away from the necessity of handling concrete objects with which we deal. Any observation of children in the schools will make it perfectly clear that where examples have been mastered, they are taken up, not in a concrete way but in an abstract arithmetical way, which is entirely legitimate, and highly economical of human energy.

What has been said with regard to arithmetic may be repeated in kind for our treatment of experiences through the use of words. If one owns a piece of farm-land he may go over the ground very carefully, and become acquainted with its character by actual contact with it. Its distances may be measured by actual movement across it. The thickness of the soil may be tested by actual labor. In these and other ways one may gain concrete knowledge of land. It does not follow, however, that one will have the highest

and most complete knowledge of his farm through this direct contact with it. Indeed, all of our experience with scientific improvement of farming shows us that it is not the person who is most concretely acquainted with a piece of land who is usually in a position to make the most important suggestions about it. It is more important that one should be able to apply to the land a vast body of knowledge which has been written down in the books of science, in the form of words. These words are not actual pictures of the landscape, nor are they the concrete experience which would be derived by going over the land. The problems of farming have all been turned into certain verbal symbols which help us to concentrate many different kinds of experience first "in our heads." The land is rolling, for example, or it is very level; the land has a thick soil or a thin soil; the land has good drainage or poor drainage. As soon as these various words have been substituted for an actual muscular experience of contact with the land itself, we are in a position to bring to bear upon the problem of dealing with the land much descriptive material which has been carefully worked out and recorded in bulletins of the Agricultural Department or in books on agriculture. To be sure, these books on agriculture never can be complete substitutes for the kind of experience that one would get in actual contact with the soil, but the two types of experience are supplementary and not identical in character. They were never intended to be substitutes for each other, and he who would neglect the ability to turn experience into words and work them over "in the head," is forgetting an important fact of human nature just as much as he who would deal with words alone is neglecting an important fact of human nature.

The words are means and devices for a most significant mode of dealing with the world, and just in so far as this significant mode of dealing with problems is cultivated, and its methods are mastered, will the learner become superior to the person who merely comes into concrete contact with objects and does not think about them.

Putting the matter which has been discussed in the last paragraph in a more general form, we may say that science is superior to mere contact with objects just because science is more comprehensive and general than the concrete. The scientist who knows

about birds and plants does not merely have more sensory experiences than the ordinary individual. Such a scientist is indeed likely to come into contact with more objects than the ordinary individual because he goes and seeks this kind of experience; but the essential fact in his scientific thinking is that he takes some common experience and relates it to the large body of knowledge which the ordinary individual never takes up. The methods by which this large body of additional knowledge is brought to bear upon present experience is not the method of mere sensory contact with the object, it is rather the method of reasoning. Such thoughtful reasoning involves the use of a highly developed scientific terminology and a body of reference material which would be utterly unmanageable without the aid of language.

It is time that someone suggested in regard to the nature-study movement, that it is not the bringing of objects into the schoolroom which will give the scientific attitude: it is rather thought about these objects, and careful inference based upon objects that will train children in scientific modes of thought. Careful inference can in no proper sense of the word be described under the term "concrete." No scientist is satisfied to look at the things about him. His largest generalizations always carry him away from these concrete facts, into the realms of thinking. It is into these realms of thinking that the child must be carried if he would see the large significance of the experiences that are presented to him. The turning of experiences into words is therefore to be recognized as an abstract method of dealing with the world supplementary to the concrete manipulation of objects. He who stops and thinks about the situation is not dealing with that situation primarily through his senses or with his hands.

Let us consider another type of illustration which is very common in our schools today. A great effort is being made in some of the schools to combine elementary science and cooking. Children are brought into contact with the operations of the kitchen on the assumption that as soon as these operations involve certain scientific principles the scientific principles should be worked out both as cooking and as science.

A brief review of the history of the race would seem to be enough

to convince the enthusiast that cooking and science are not necessarily related. Practical operations in cooking were brought to a degree of perfection long before there was a chemistry of foods. On the other hand, the chemistry of foods has gradually arisen in remote laboratories which are very far from the kitchens where most of the actual food of the race has been prepared. The chemistry of organic substances is a highly developed form of science which involves some of the most elaborate technique that is at the command of trained scientists.

Any psychological analysis of the cooking activity and of the thought processes on the part of the organic chemist, ought to convince the student of domestic science that these two forms of experience are at least not identical. To boil common potatoes in water on the one hand and to recognize starch in unboiled potatoes by the iodine test on the other, are two totally different attitudes toward potatoes. It is very doubtful whether, in the earlier years of the child's life, there is any possibility of bringing together these two attitudes. They are likely to be disturbing to each other. They are undoubtedly capable of being related to each other at some stage of education, but they do not flow at once into each other.

The above examples have been chosen for the purpose of making it as clear as possible that in our school work we are constantly training a great variety of different attitudes towards things. In the use of tools and in the use of words we are training different modes of treatment of the world. One of these modes of treatment is the constructive mode, another mode is the arithmetical mode of treatment, a third is the verbal mode of treatment, and so on down the list. The reason why the school has to treat these different types of relation to the world separately is that each has its own independent justification, and its own definite character. We ought not to make the mistake of thinking that we can substitute the arithmetical attitude for the constructive attitude. On the other hand, it should be noted with perfect clearness that there is no remote possibility of substituting the constructive attitude for the arithmetical attitude. While the school of the last generation was in some danger of assuming that its work was done when it

taught the arithmetical attitude, there are certain examples in our generation of a tendency to make the mistake of believing that the work of the school is done when the constructive attitude has been trained.

We must recognize that the term "concrete" has its place in our education just so far as we can show the legitimacy of concrete reactions upon the external world. Abstract training can be justified with equal emphasis and we are justified whenever we point out that abstract methods of treating the external world are of advantage to the individual. We should no more eliminate abstractions from our school work than we eliminate abstractions from our ordinary life. Indeed the abstract has superior virtues which have been touched upon in the foregoing illustrations. There is danger that these virtues will be overlooked in the enthusiasm for concrete experience which is characteristic of our present-day education.

[*To be continued*]

EDITORIAL NOTES

Significance of the Problem of Promotion

Mr. Mirick's article in the present number of the *Elementary School Teacher* raises in a very concrete way a number of questions regarding promotion which are of vital importance to every member of the school system. The interest of the superintendent and principal is so obvious that it calls for no comment. The individual teacher cannot do her work successfully if the children in the class are so different in maturity and previous equipment that they cannot work together. The backward child is discouraged; the forward child learns habits of neglect and forms a false estimate of the importance of all intellectual tasks. The parents are dissatisfied with the associations into which the child is brought, and are critical of a system which holds a child back for reasons which do not tally with the evident needs of the child.

Vague Reasons for Promotion

The fundamental difficulty in this matter as in many of the other aspects of educational organization is the lack of any clear guiding principles underlying practice. The individual teacher sometimes recommends promotion not because of any clearly statable reasons; or, what is worse, the teacher recommends the holding back of a child on the weakest of pretexts. Thus, some teachers undoubtedly recommend that a given child go forward when their patience and resources are exhausted. They have perhaps done all that they can for the child in question and look upon promotion as a device for putting an end to what seems to be fruitless effort. On the other hand, some teachers hold children back unduly because they wish to avoid criticism from the teacher next above. They send forward only those children of whom they are perfectly sure, so that the next teacher may be impressed with the proficiency of the preparation given in the lower grade. Such reasons as these are seldom stated in these bald terms and they are certainly not generally acceptable when put in this form.

Another serious defect in the promotion system is to be found

in the fact that practice, even within the bounds of a single school building, is not uniform. The principal may intend to supervise the school in such a way as to make all promotions on the same basis, but he does not know the pupils intimately, and his information from the teachers differs in value and differs in the expectations which lie back of each teacher's personal judgments. If the principal cannot judge accurately, certainly the superintendent cannot. The only hope of securing uniformity is to begin a full study of the matter involving every school and every teacher.

How Can Uniformity Be Gained?

It requires some courage to face all these facts as is done in the Indianapolis system. Most school officers are timid about admitting that they have ever made mistakes. Of course, the Indianapolis schools have been no more guilty than other systems. So far, however, this system has been the first to take up for its own sake, and incidentally for the sake of other school systems, a systematic study of the whole problem. Furthermore, this system is in advance of others in opening up a rational and carefully organized experiment to correct the evils discovered, and to study the effects of newer, and what seem to be better, practices.

Value of the Indianapolis Study

Reform is significant wherever it is conscientiously made. The difficulty with most reforms, however, is that there is no adequate evidence on which to base a judgment either of the needs of reform or its effects. Here is a most significant change in practice backed up by a clear-headed statement of the reasons for the change and by a series of investigations that make it possible to evaluate with perfect precision the outcome. Such reform rises to the level of scientific organization. That a great system of schools, recognized as one of the most efficient in the country, should give an example of scientific organization such as we have here is a matter of congratulation. Others of less courage and initiative will undoubtedly be induced to follow this example. Mr. Mirick's report is a long step in advance in the administration of schools. He and his associates in that city, as well as their former leader, Mr. Kendall, have done a large public service in this study.

Scientific School Organization

BOOK REVIEWS

Introduction to Psychology. By ROBERT M. YERKES, Assistant Professor of Comparative Psychology, Harvard University. New York: Henry Holt & Co., 1911.

The Essentials of Psychology. By W. B. PILLSBURY, Professor of Psychology, University of Michigan. New York: Macmillan, 1911.

The appearance of two new introductory texts in psychology will be of interest to educational readers. These books contain the new material which has been worked out in recent years and they give new emphasis to the scientific spirit which now characterizes psychology as an independent discipline.

Professor Yerkes has adopted a somewhat unique view regarding the function of a textbook which is to serve as an introduction. Most writers regard it as the function of such a book to furnish the reader with the fundamental results of the science. Professor Yerkes, on the other hand, has pushed the results of the science somewhat into the background and has devoted much attention to discussion of what the science is from a logical point of view. What are the methods of the science? What are the characteristics in which psychology resembles physics and chemistry? How far can psychology establish generalization? What is the nature of a psychological law? These and similar questions are the matters chiefly discussed.

One wonders whether the elementary student will be able to take this "outside" point of view toward a science which he approaches for the first time. One cannot but be skeptical about the ability of an elementary student to follow the elaborate discussions of physical and chemical analogies and contrasts. In short, it seems to the present reviewer that the book has little to recommend it as an elementary text. Students who wish to critically discuss the logic of the science may take the book in hand. The teacher who is looking for applications may find suggestions here and there, but in the main the book should not be used as a first text even by mature readers.

Professor Pillsbury's book is wholly different in type. The essential results of psychological investigation are here presented in a simple and very usable form. The book reminds one strongly of James's *Briefer Course* or Angell's *Psychology*. The general concepts of Attention and Association are taken up early in the text and the particular processes of perception and memory, etc., are taken up later. There is a very good introductory treatment of the nervous system. The structural aspects of consciousness are emphasized.

This book will undoubtedly be very useful as an introductory text. Teachers will find little or no effort to suggest applications but they will find a very satisfactory statement of the most recent results on which to base educational applications.

C. H. J.

BOOKS RECEIVED

THE MACMILLAN CO., NEW YORK

The English Language. Book I. By SARAH WITHERS AND JAMES P. KINARD. Cloth. Illustrated. Pp. 289. $0.40.

The English Language. Book II. By JAMES P. KINARD AND SARAH WITHERS. Cloth. Illustrated. Pp. 270. $0.55.

The Study of History in Secondary Schools. Report of the American History Association by a Committee of Five. Cloth. Pp. 72. $0.25.

Dictation Day by Day. By KATE VAN WAGENEN. Cloth. Pp. 127. Illustrated. $0.20.

Educational Values. By WILLIAM CHANDLER BAGLEY. Cloth. Pp. 259. $1.10.

Select Orations. Edited with Introduction by ARCHIBALD MCCLELLAND HALL. Cloth. Pp. 207. $0.25.

A Short History of the American People. By EDNA HENRY LEE TURPIN. Cloth. Illustrated. Pp. 478. $0.90.

The Pupil's Arithmetic. Book III. By JAMES C. BYRNES; JULIA RICHMAN; JOHN S. ROBERTS. Cloth. Pp. 256. $0.35.

The Pupil's Arithmetic. Book IV. By JAMES C. BYRNES; JULIA RICHMAN; JOHN S. ROBERTS. Cloth. Pp. 235. $0.35.

Proceedings of the Fourth Annual Meeting of the Association of Life Insurance Presidents, Held in the Hotel La Salle, Chicago, Ill., December 9 and 10, 1910. Paper. Pp. 215.

Principles of Education Applied to Practice. By W. FRANKLIN JONES. Cloth. Pp. 293. $1.00.

American History for Grammar Schools. By MARGUERITE STOCKMAN DICKSON. Cloth. Pp. 531. $1.00.

The Continents and Their People: North America, A Supplementary Geography. By JAMES FRANKLIN CHAMBERLAIN AND ARTHUR HENRY CHAMBERLAIN. Cloth. Pp. 295. $0.55.

CHARLES E. MERRILL CO.

Culture Readers. Book I. By ELLEN E. KENYON-WARNER. Cloth. Pp. 128. $0.30.

Alice's Adventures in Wonderland. By LEWIS CARROLL. Cloth. Pp. 187. $0.30.

RAND, MCNALLY & CO., CHICAGO

A Dog of Flanders. By LOUISE DE LA RAMÉE (Ouida). Edited by ROSE C. SWART. Cloth. Illustrated. Pp. 100. $0.25.

ROW, PETERSON & CO.

First Reader. By HARRIETTE TAYLOR TREADWELL AND MARGARET FREE. Cloth. Pp. 134.

THE SALEM PRESS CO.

Vanished Arizona. By MARTHA SUMMERHAYS. Cloth. Pp. 319. $1.50.

CHARLES SCRIBNER'S SONS, NEW YORK

Indoors and Out. By SARAH M. MOTT AND PERCIVAL CHUBB. Illustrated. Cloth. Pp. 118.

THE UNIVERSITY OF CHICAGO PRESS, CHICAGO

The Unfolding of Personality as the Chief Aim in Education. By THISELTON MARK. Cloth. Pp. 224. $1.07 postpaid.

Alumni Directory, The University of Chicago. 1861–1910. Cloth. Pp. 297.

The Elementary Course in English. By JAMES FLEMING HOSIC. Cloth. Pp. 150. $0.82.

WARWICK & YORK

Educational Psychology Monographs. By J. E. WALLACE WALLIN. Cloth. Pp. 86.

Educational Psychology Monographs. By W. H. WINCH. Cloth. Pp. 98.

CURRENT EDUCATIONAL LITERATURE IN THE PERIODICALS[1]

IRENE WARREN
Librarian, School of Education, The University of Chicago

ANDREWS, FANNIE FERN. The American school peace league. Child 1:969–70. (Ag. '11.)

BADLEY, J. H. Handwork in education. Child 1:939–50. (Ag. '11.)

COCKERELL, T. D. A. The university in politics. Pop. Sci. Mo. 79:160–64. (Ag '11.)

(A) fund for public school betterment in Pittsburgh. Science 34:47. (14 Jl. '11.)

Growth of our art institutions. Lit. D. 43:207–8. (5 Ag. '11.)

HARRIS, J. ARTHUR. Francis Galton. Pop. Sci. Mo. 79:171–90. (Ag. '11.)

HITCHING, WILENA. The teaching of home management in elementary schools. Child 1:951–55. (Ag. '11.)

HOWERTH, IRA W. The classification of the sciences. Pop. Sci. Mo. 79:165–70. (Ag. '11.)

HUTCHINSON, WOODS. Can the child survive civilization? Child 1:966–68. (Ag.'11.)

Insurgent educators. Lit. D. 43:175. (29 Jl. '11.)

JACOB, MARY S. The colour-sense of children. Child 1:962–65. (Ag.'11.)

LOEB, JACQUES. The significance of tropisms for psychology. Pop. Sci. Mo. 79:105–25. (Ag. '11.)

MACLAURIN, RICHARD C. Darwin at an American university. Atlan. 108:192–98. (Ag. '11.)

MANGOLD, GEORGE B. Child welfare and street trades in the United States of America. Child 1:956–61. (Ag. '11.)

MAYER, MARY JOSEPHINE. Our public schools as social centers. R. of Rs. 43:201–8. (Ag. '11.)

ROLKER, A. W. (The) college woman in business. Good Housekeeping 53:147–53. (Ag. '11.)

ROYCE, JOSIAH. James as a philosopher. Science 34:33–45. (14 Jl. '11.)

SWIFT, EDGAR J. The genesis of the attention in the educative process. Science 33:1–5. (7 Jl. '11.)

Technical libraries for employees. Print. Art 17:469–70. (Ag. '11.)

WOLFE, A. B. What makes a college? Pop. Sci. Mo. 79:151–59. (Ag. '11.)

[1] *Abbreviations.*—Atlan., Atlantic Monthly; Lit. D., Literary Digest; Pop. Sci. Mo., Popular Science Monthly; Print. Art, Printing Art; R. of Rs., Review of Reviews.